Case report: unusual complication during outpatient continuous regional popliteal analgesia

Saporito, Andrea ; Sturini, Evelina ; Petri, John ; Borgeat, Alain ; Aguirre, José

Abstract: PURPOSE: Continuous regional anesthesia applied as pain therapy at home is clinically established standard practice after upper and lower limb surgery. Persistent motor block at discharge or after continuous infusion of local anesthetics, however, might lead to complications related to the insensate extremity. We report a rare case of a foot fracture due to stumbling after continuous sciatic nerve block at home and discuss the related clinical implications. CLINICAL FEATURES: After uncomplicated ambulatory foot surgery under regional anesthesia, a patient was discharged with a continuous sciatic popliteal nerve block for pain therapy at home. After stumbling, the patient remained symptom-free even until catheter removal three days after surgery. Radiography done one week after surgery revealed a styloid fracture of the fifth metatarsal bone. Her subsequent recovery was uneventful. CONCLUSIONS: The true incidence of complications related to falls at home associated with lower extremity blockade remains unknown, as symptoms of possible complications may be masked by the effects of the local anesthetic. However, with increasing use of postoperative regional anesthesia, it is mandatory to develop and adhere to clinical care maps, and to elaborate and teach strategies to further enhance patient safety.

DOI: https://doi.org/10.1007/s12630-012-9758-9

Can J Anesth/J Can Anesth (2012) 59:958–962
DOI 10.1007/s12630-012-9758-9

CASE REPORTS/CASE SERIES

Case report: Unusual complication during outpatient continuous regional popliteal analgesia

Étude de cas: Complication inhabituelle pendant un bloc régional poplité continu chez un patient ambulatoire

Andrea Saporito, MD · Evelina Sturini, MD · John Petri, MD · Alain Borgeat, MD · José A. Aguirre, MD

Received: 14 May 2012 / Accepted: 10 July 2012 / Published online: 25 July 2012

Abstract

Purpose *Continuous regional anesthesia applied as pain therapy at home is clinically established standard practice after upper and lower limb surgery. Persistent motor block at discharge or after continuous infusion of local anesthetics, however, might lead to complications related to the insensate extremity. We report a rare case of a foot fracture due to stumbling after continuous sciatic nerve block at home and discuss the related clinical implications.*

Clinical features *After uncomplicated ambulatory foot surgery under regional anesthesia, a patient was discharged with a continuous sciatic popliteal nerve block for pain therapy at home. After stumbling, the patient remained symptom-free even until catheter removal three days after surgery. Radiography done one week after surgery revealed a styloid fracture of the fifth metatarsal bone. Her subsequent recovery was uneventful.*

Conclusions *The true incidence of complications related to falls at home associated with lower extremity blockade remains unknown, as symptoms of possible complications may be masked by the effects of the local anesthetic. However, with increasing use of postoperative regional anesthesia, it is mandatory to develop and adhere to clinical care maps, and to elaborate and teach strategies to further enhance patient safety.*

Résumé

Objectif *L'anesthésie régionale continue utilisée comme traitement de la douleur à domicile est une pratique standard reposant sur des bases cliniques après chirurgie du membre supérieur ou inférieur. Un bloc moteur persistant au moment du congé de l'hôpital ou après instillation d'anesthésiques locaux peut, toutefois, conduire à des complications liées à l'extrémité insensibilisée. Nous décrivons un cas rare de fracture du pied secondaire à un faux-pas après un bloc continu du nerf sciatique à domicile et discutons de ses implications cliniques.*

Caractéristiques cliniques *Après une chirurgie ambulatoire non compliquée du pied sous anesthésie régionale, une patiente a obtenu son congé avec un bloc nerveux continu du sciatique poplité pour le contrôle de la douleur au domicile. Après avoir trébuché, la patiente est restée asymptomatique jusqu'au retrait du cathéter trois jours après l'intervention chirurgicale. La radiographie pratiquée une semaine après la chirurgie a révélé une fracture de la styloïde du cinquième métatarsien. Sa guérison s'est déroulée sans incidents.*

Conclusions *La véritable incidence des complications liées aux chutes à domicile, associées à des blocs nerveux des membres inférieurs, reste inconnue; de même, les*

Author contributions All authors made material contributions to the handling of this case and to the intellectual content of this article. All authors approved the original submission and the final published version of this article.

A. Saporito, MD
Department of Anesthesiology, Regional and Ambulatory Anesthesia Unit, Bellinzona Regional Hospital, Bellinzona, Switzerland

E. Sturini, MD
Department of Anesthesiology, St. Chiara Clinic, Locarno, Switzerland

J. Petri, MD
Department of Orthopedics, Bellinzona Regional Hospital, Bellinzona, Switzerland

A. Borgeat, MD · J. A. Aguirre, MD (✉)
Division of Anesthesiology, Balgrist University Hospital, Forchstrasse 340, CH-8008 Zurich, Switzerland
e-mail: jose.aguirre@balgrist.ch

symptômes des complications possibles peuvent être masquées par l'action de l'anesthésique local. Cependant, avec l'utilisation croissante de l'anesthésie régionale postopératoire, il devient impératif d'élaborer des plans de soins cliniques et de s'y tenir, et d'élaborer et enseigner des stratégies pour améliorer encore la sécurité des patients.

Perioperative fast-track management has been shown to be a safe, effective way to improve efficiency, patient satisfaction, and outcome. The ambulatory setting allows bypassing the postanesthesia care unit after surgery, thereby optimizing costs and the workload.[1] Early discharge, with lower hospital cost, is possible if regional anesthesia with subsequent tailored continuous perineural block (cPNB) can be provided at the patient's home.[2,3] Considering that pain and postoperative nausea and vomiting are the main reasons for prolonged hospitalisation[4] or re-hospitalisation[5] after ambulatory surgery, the introduction of continuous regional techniques for outpatients might reduce the incidence of these complications.[6] Reduction of opioids and their related side effects,[7] better joint function after painful joint surgery,[8] possible reduction of chronic pain, and optimisation of the patient's daily activities are some of the additional advantages of regional anesthesia techniques. These advantages can explain the increasing interest in these techniques for ambulatory procedures.[9-11]

Several potential inherent risks have been described, including infection, nerve injury, catheter migration, local anesthetic toxicity, catheter retention, and pressure ulcers due to insensate extremities.[12] The most feared complications of continuous regional analgesia of the lower extremities at home, however, are the effects of stumbling.

We did not find any reports of falls by patients who had undergone single sciatic (continuous) nerve block based on an OVID and PubMed search (1992 to April 2012) using the keywords "nerve block," "sciatic," "sciatic nerve block," "accidental fall," "fall," and "fell." Case reports in the literature have dealt with continuous femoral nerve block and combinations with sciatic nerve block as potential risk factors for falls at home.[13-20]

We present a rare case of stumbling causing a complication of a continuous popliteal sciatic nerve block during home therapy with a subsequently undetected styloid fracture of the fifth metatarsal bone. The patient gave written informed consent for publication of this article.

Case

A 77-yr-old American Society of Anesthesiologists physical status Class II woman was scheduled for percutaneous correction of a right hallux valgus (Fig. 1). Her medical history was unremarkable except for hypertension and hypercholesterolemia. She was amenable to regional anesthesia and consented also to an outpatient postoperative continuous analgesia protocol.

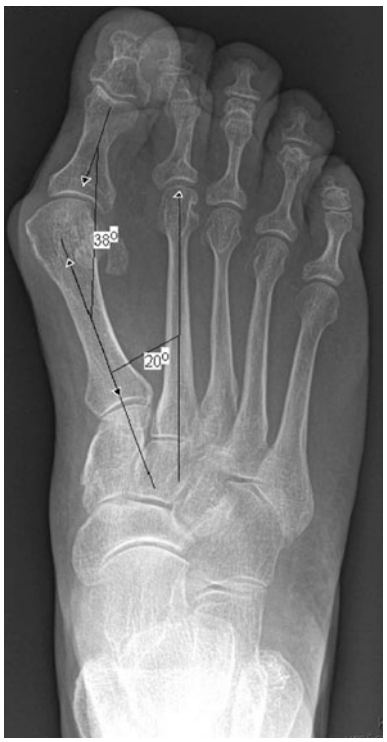

Fig. 1 Preoperative radiograph of the right forefoot

The patient was premedicated with midazolam 3.75 mg *po* and paracetamol 1 g *po*. In the operating room and after application of routine monitors, she underwent an uneventful, ultrasonography-guided right popliteal block with an initial bolus of 20 mL mepivacaine 1.5%. A perineural catheter (Stimulplex; B. Braun, Freiburg, Germany) was introduced 4 cm beyond the tip of the needle, subsequently checked by ultrasonography, and finally secured to the skin with a transparent dressing. The surgical procedure was uneventful, and the patient was discharged to the outpatient clinic immediately after the procedure.

According to our clinical protocol, after surgery a continuous infusion of ropivacaine 0.15% was initiated at a rate of 5 mL·hr-1 through a disposable elastomeric pump (Easy-pump; B. Braun) after recovering mobility of her toes. The patient was prescribed diclofenac 3× 50 mg *po* for the first three days after surgery and discharged home accompanied by a relative. She was allowed full use of the lower extremity based on the symptoms. A pain nurse conducted telephone monitoring according to our standard protocol (see below) until catheter removal.

The patient reported no pain (numeric rating scale = 0) up to the time of catheter removal on postoperative day

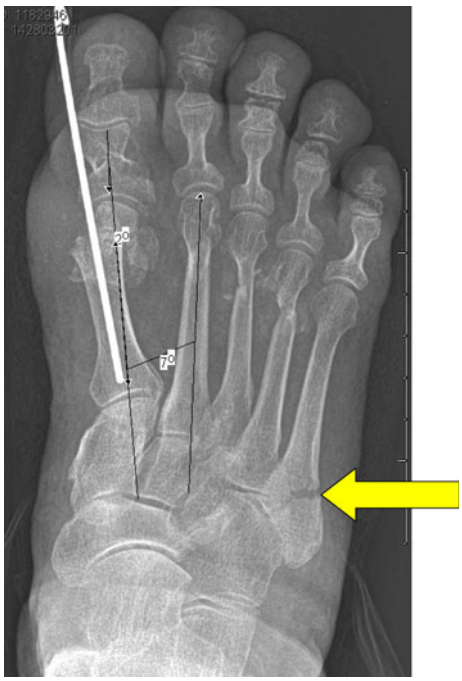

Fig. 2 Control radiograph on postoperative day six shows a styloid fracture of the fifth metatarsal bone (arrow)

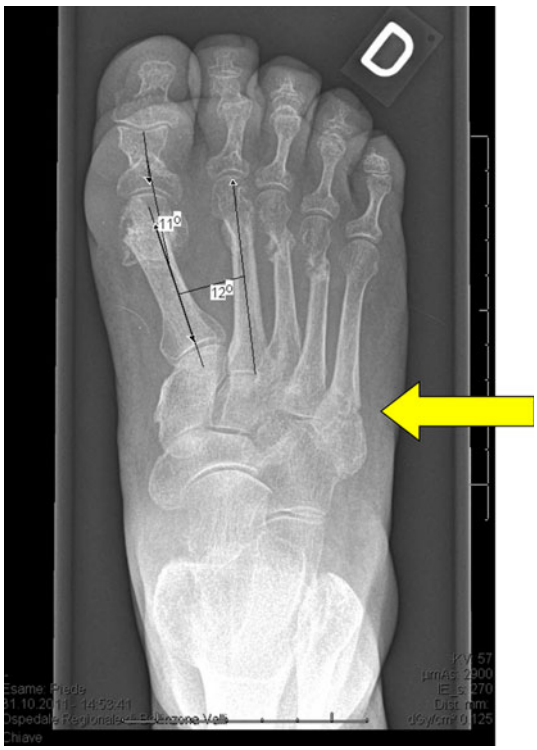

Fig. 3 Control radiograph six weeks after surgery shows a consolidated styloid fracture of the fifth metatarsal bone (arrow)

(POD) 3 and no persistent motor block. However, she complained about numbness and prickling of the toes after prolonged sitting on PODs 1 and 2. On POD 2 she reported that 20 min after a period of prolonged sitting she stumbled without falling. She remained pain-free after this event. Additionally, she noticed decreased motor function of the toes and ankle, with slow recovery. The pain nurse could not determine the reason for the stumbling, such as alcohol, drug intake, carpets on the floor, or dizziness. Therefore, the patient was offered a checkup in our department to evaluate the function of the catheter. She refused as she remained pain-free, and a follow-up visit was planned for POD 6. The patient was advised to use crutches if there was further numbness or decreased motor function after prolonged sitting and to stop the infusion temporarily. The patient removed the catheter uneventfully at POD 3. At six hours after catheter removal she reported pain over the base of the fifth metatarsal bone that was partially relieved by oral analgesics at home. She came for her follow-up visit on POD 6, and a radiograph of her foot showed evidence of a styloid fracture of the fifth metatarsal bone (Fig. 2) that had not been present on the fluoroscopic control scan in the operating room immediately after surgery.

There was full recovery of motor and sensory functions, and apart from slight pain the fracture was asymptomatic. Conservative management was advised: wearing an orthopedic shoe for six weeks until complete osseous unification. There were no further complications (Fig. 3).

Discussion

An outpatient continuous regional analgesia protocol was specifically implemented in our facility for ambulatory orthopedic patients after forefoot surgery using a continuous popliteal block. The standard protocol for the education and follow-up of patients treated with cPNB at home is similar to protocols reported in the literature and includes the following[6,11]:

1) Discussion of the risks and benefits of cPNB and ambulant treatment, with written informed consent;
2) Detailed verbal instructions to the patient and relatives regarding catheter care, side effects, and management;
3) Comprehensive written instructions highlighting management and side effects of the catheter given to the patient before discharge;
4) Written contact information about an anesthesiologist who is available 24 hr a day and for the pain nurse in charge of the follow-up;
5) Discharge (accompanied by a responsible adult) only after recovery of motor function.
6) Follow-up telephone contact established by the pain nurse from POD 1 until catheter removal. The patient is questioned specifically about adequate pain control, side effects/complications (e.g., persistent motor

block, accidental falls). Patient is reminded about contacting the anesthesiologist/pain nurse and how to remove the catheter correctly at POD 3;

7) Postoperative visit at the outpatient clinic within one week after surgery, where pain and sensory and motor function are assessed and patient is examined for erythema, discharge, and/or swelling of the operated limb. Catheter entry is assessed for swelling/infection;
8) Follow-up data sheet of the outpatient with cPNB is kept in the patient's records;
9) Prescriptions for oral diclofenac (non-steroidal anti-inflammatory drug) 3× 50 mg *po* for three days as an adjunct to the catheter-based analgesia;
10) Catheter removal at POD 3 (according to pump volume used).

Since January 2009, a total of 740 patients have been managed with this regimen at our institution. The duration of the catheter in place was 4.3 ± 1.4 days, with the most frequently reported side effect being persistent motor block of the ankle and foot (5.9% of cases). This side effect was successfully managed over the telephone by advising the patient to stop the infusion temporarily.[21] After this long case series, the patient presented here represents the first case (0.14% incidence) of stumbling and subsequent minor fracture due to continuous popliteal nerve block.

The risk of harm due to falls was declared to be the subject of a national patient safety effort by the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) in 2005.[22] The risks related to the use of cPNB for the lower extremity are somewhat underestimated.[19] Muraskin *et al*.[15] and Fiolkowski *et al*.,[23] who performed nerve blocks on volunteers, showed that these blocks impair proprioception and joint stiffness. The inability to control stiffness has been blamed for contributing to falls in the elderly and patients with peripheral neuropathy.[24] Despite the large number of cPNBs performed for lower extremity surgery, there are fewer case reports of an increase in the incidence of falls due to lower extremity cPNB.[16] Despite initial recovery of motor function following a bolus of local anesthetic, a subsequent motor block can develop, as reported by 5.9% of our patients. Salinas *et al*., who also conducted a study of volunteers, reported that after an infusion of 0.2% ropivacaine at 10 $mL \cdot hr^{-1}$ through a femoral catheter, a subsequent quadriceps motor block developed within five hours after an initial recovery.[25] The relation between prolonged sitting and increased numbness and pinprick sensation with subsequent motor block remains unclear. The additional nerve compression could have led to an additional effect on nerve conduction or produced a more "toxic" level of local anesthetic, leading to impaired sensory and motor function. Therefore, during patient education, the use of aids that increase stability while walking and turning (e.g., walkers, crutches) should be emphasized. Also, the analgesia provided by ongoing continuous regional anesthesia can mask symptoms of an injury after stumbling or falling. Therefore, the patient's education and daily follow-up by telephone are the main instruments for early detection of any residual motor block.[6,10,11]

The true incidence of complications at home related to lower extremity blockade remains unknown, as symptoms of possible complications may be masked by the effects of the local anesthetic. However, with increasing use of ambulatory regional anesthesia postoperatively, it is mandatory to develop and to adhere to clinical care maps and to teach strategies to further enhance patient safety.

Disclosure of funding None.

Conflicts of interest None declared.

References

1. *Williams BA*, *Kentor ML*, *Vogt MT*, *et al*. Economics of nerve block pain management after anterior cruciate ligament reconstruction: potential hospital cost savings via associated postanesthesia care unit bypass and same-day discharge. Anesthesiology 2004; 100: 697-706.
2. *Ilfeld BM*. Continuous peripheral nerve blocks in the hospital and at home. Anesthesiol Clin 2011; 29: 193-211.
3. *McCartney CJ*, *Brull R*, *Chan VW*, *et al*. Early but no long-term benefit of regional compared with general anesthesia for ambulatory hand surgery. Anesthesiology 2004; 101: 461-7.
4. *Wu CL*, *Berenholtz SM*, *Pronovost PJ*, *Fleisher LA*. Systematic review and analysis of postdischarge symptoms after outpatient surgery. Anesthesiology 2002; 96: 994-1003.
5. *Ilfeld BM*, *Enneking FK*. Continuous peripheral nerve blocks at home: a review. Anesth Analg 2005; 100: 1822-33.
6. *Swenson JD*, *Bay N*, *Loose E*, *et al*. Outpatient management of continuous peripheral nerve catheters placed using ultrasound guidance: an experience in 620 patients. Anesth Analg 2006; 103: 1436-43.
7. *Richman JM*, *Liu SS*, *Courpas G*, *et al*. Does continuous peripheral nerve block provide superior pain control to opioids? A meta-analysis. Anesth Analg 2006; 102: 248-57.
8. *Ilfeld BM*, *Vandenborne K*, *Duncan PW*, *et al*. Ambulatory continuous interscalene nerve blocks decrease the time to discharge readiness after total shoulder arthroplasty: a randomized, triple-masked, placebo-controlled study. Anesthesiology 2006; 105: 999-1007.
9. *Capdevila X*, *Dadure C*, *Bringuier S*, *et al*. Effect of patient-controlled perineural analgesia on rehabilitation and pain after ambulatory orthopedic surgery: a multicenter randomized trial. Anesthesiology 2006; 105: 566-73.
10. *Ilfeld BM*, *Thannikary LJ*, *Morey TE*, *Vander Griend RA*, *Enneking FK*. Popliteal sciatic perineural local anesthetic infusion: a comparison of three dosing regimens for postoperative analgesia. Anesthesiology 2004; 101: 970-7.
11. *Ilfeld BM*, *Morey TE*, *Wang RD*, *Enneking FK*. Continuous popliteal sciatic nerve block for postoperative pain control at

home: a randomized, double-blinded, placebo-controlled study. Anesthesiology 2002; 97: 959-65.
12. *Ilfeld BM*. Continuous peripheral nerve blocks: a review of the published evidence. Anesth Analg 2011; 113: 904-25.
13. *Goodman MJ*. American Academy of Orthopaedic Surgeons (AAOS). Risk Management Spotlight. Fall Prevention Following Regional Nerve blocks for Postoperative Analgesia. AAOS Online Bulletin, 2006. Available from URL: http://www2.aaos.org/aaos/archives/bulletin/toc.cfm?IssueMonthName=February&IssueYear=2006 (accessed June 2012).
14. *Williams BA*, *Kentor ML*, *Bottegal MT*. The incidence of falls at home in patients with perineural femoral catheters: a retrospective summary of a randomized clinical trial. Anesth Analg 2007; 104: 1002.
15. *Muraskin SI*, *Conrad B*, *Zheng N*, *Morey TE*, *Enneking FK*. Falls associated with lower-extremity-nerve blocks: a pilot investigation of mechanisms. Reg Anesth Pain Med 2007; 32: 67-72.
16. *Ilfeld BM*, *Duke KB*, *Donohue MC*. The association between lower extremity continuous peripheral nerve blocks and patient falls after knee and hip arthroplasty. Anesth Analg 2010; 111: 1552-4.
17. *Atkinson HD*, *Hamid I*, *Gupte CM*, *Russell RC*, *Handy JM*. Postoperative fall after the use of the 3-in-1 femoral nerve block for knee surgery: a report of four cases. J Orthop Surg (Hong Kong) 2008; 16: 381-4.
18. *Feibel RJ*, *Dervin GF*, *Kim PR*, *Beaule PE*. Major complications associated with femoral nerve catheters for knee arthroplasty: a word of caution. J Arthroplasty 2009; 24(6 Suppl): 132-7.
19. *Kandasami M*, *Kinninmonth AW*, *Sarungi M*, *Baines J*, *Scott NB*. Femoral nerve block for total knee replacement - a word of caution. Knee 2009; 16: 98-100.
20. *Klein SM*, *Nielsen KC*, *Greengrass RA*, *Warner DS*, *Martin A*, *Steele SM*. Ambulatory discharge after long-acting peripheral nerve blockade: 2382 blocks with ropivacaine. Anesth Analg 2002; 94: 65-70.
21. *Saporito A*, *Sturini E*, *Tomasetti R*, *Anselmi L*, *Beretta F*. Continuous popliteal block at home: a postoperative analgesia protocol for outpatient foot surgery patients. Eur J Anaesthesiol. 2010; 27(Suppl 1): 35.
22. *The Joint Commission*. Fatal falls: Lessons for the Future - Sentinel Event Alert; Issue 14: 2000; Available from URL: http://www.jointcommission.org/sentinel_event_alert_issue_14_fatal_falls_lessons_for_the_future/ (Accessed June 2012).
23. *Fiolkowski P*, *Brunt D*, *Bishop M*, *Woo R*. Does postural instability affect the initiation of human gait? Neurosci Lett 2002; 323: 167-70.
24. *Bortolami SB*, *DiZio P*, *Rabin E*, *Lackner JR*. Analysis of human postural responses to recoverable falls. Exp Brain Res 2003; 151: 387-404.
25. *Salinas FV*, *Neal JM*, *Sueda LA*, *Kopacz DJ*, *Liu SS*. Prospective comparison of continuous femoral nerve block with nonstimulating catheter placement versus stimulating catheter-guided perineural placement in volunteers. Reg Anesth Pain Med 2004; 29: 212-20.